established, acid rain pollution is one of the causes of the forest decline being experienced in eastern Canada and the eastern United States. Surveys of red spruce in New England and New York have shown serious decline: In 23 percent of the acreage surveyed, at least 50 percent of the trees have either died or suffered serious damage (that is, the loss of 50 percent or more of foliage from live crowns). Various pine species in the U.S. Southeast are showing a reduced rate of growth. There is major sugar maple dieback in Quebec, and, to a lesser extent, in Ontario. Surveys of beech, red maple and yellow birch in Atlantic Canada have shown decline symptoms. Acid rain pollution is thought to be implicated through accelerated nutrient leaching from soils and foliage, mobilization of toxic metals in soil water and increased tree susceptibility to disease, drought and other climatic stresses.[3]

Corrosion and deterioration of materials in buildings, including structures important to cultural heritage, are, in part, caused by acid rain pollution. The primary effect of acid deposition is to accelerate naturally occuring decay processes. The formation of crusts and black deposits is highly visible evidence of the interaction of acid rain pollution with stone. Limestone and marble, the materials used in many Canadian and American monuments and buildings, including the Parliament buildings in Ottawa and the Capitol in Washington, are particularly vulnerable to damage.

There is growing evidence of a direct link between exposure to acid rain pollution and respiratory problems in children and asthmatics. Recent studies in Canada and the United States have found a strong association between changes in respiratory mortality and frequency of respiratory problems and elevated levels of sulphur dioxide, sulphates and sulphuric acid aerosols. Acid deposition can also pose an indirect health hazard by increasing the levels of toxic metals in the untreated drinking water storage and distribution systems.[4]

Finally, acid rain pollution is one of the major contributors to reduced visibility in the atmosphere over much of eastern North America during the summer months.

The economic benefits of controlling acid rain emissions are difficult to estimate. Based on studies done by Environment Canada, the benefits of reducing acid rain pollution in Canada are conservatively estimated to be about (U.S.)$800 million annually. A study authored by the U.S. Congressional Research Service (CRS) estimates the benefits of acid rain controls in the United States at $5.5 to $8.2 billion annually. CRS notes that a significant portion of the benefits would occur in urban areas.

For comparative purposes, Canada's acid rain control program is estimated to cost (U.S.) $400 million annually or about (U.S.)$15 per capita. While costs in the United States vary dramatically, depending on the approach chosen, a program similar to Canada's has been forecast by CRS to cost $2.5 to $4.0 billion annually or $10 to $15 per capita.

[1]Jeffries, D.S., *et al*, 1986. *Regional Chemical Characteristics of Lakes in North America, Part 1: Eastern Canada, Water, Air and Soil Pollution*, Vol.31, pages 551-567.

[2]EPA National Lake and Stream Surveys.

[3]Joint Report to the Canada-U.S. Bilateral Advisory and Consultative Group.

[4]See testimony on February 3, 1987, before the Senate Environmental Protection Subcommittee on "The Health Effects of Precursors of Acid Deposition," by representatives of the American Academy of Pediatrics, American Lung Association, American Public Health Association and Mount Sinai Medical Center (Environmental and Occupational Medicine), for details on health effects.

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